Geometry, thermal structure and kinematics of the metamorphic dome of Ikaria (eastern Cyclades, Greece): implication for Aegean tectonics

Alexandre Beaudoin, Valentin Laurent, Romain Augier, Laurent Jolivet, Abdeltif Lahfid, Laurent Arbaret, Aurélien Rabillard

Geophysical Research Abstracts
Vol. 16, EGU2014-12128, 2014
EGU General Assembly 2014

Geometry, thermal structure and kinematics of the metamorphic dome of Ikaria (eastern Cyclades, Greece): implication for Aegean tectonics

Alexandre Beaudoin (1,2,3), Valentin Laurent (1,2,3), Romain Augier (1,2,3), Laurent Jolivet (1,2,3), Abdeltif Lahfid (3), Laurent Arbaret (1,2,3), Aurélien Rabillard (1,2,3)

(1) Université d'Orléans, ISTO, UMR 7327, 45071, Orléans, France, (2) CNRS/INSU, ISTO, UMR 7327, 45071 Orléans, France, (3) BRGM, ISTO, UMR 7327, BP 36009, 45060 Orléans, France

The Aegean domain has been characterized since the Oligocene by extensional tectonics caused by the southward retreat of the African slab subducting beneath Eurasia. Structures and associated kinematics relative to this extensional tectonics are well constrained in the western Cyclades and the Menderes massif of western Turkey. Major extensional detachments such as the North Cycladic Detachment System (NCDS) or the Simav Detachment have accommodated the exhumation of a series of metamorphic core complexes (MCC) from Andros-Tinos-Mykonos in the west to the northern Menderes massif in the east. However, the transition between the NCDS and the Simav Detachment is currently not understood. This transition is located above a large-scale tear in the Aegean slab and its effects on the kinematics of deformation and P-T-t evolution of the overlying thinned crust are not known. The geology of Ikaria Island, located in this region, remains poorly known and the few existing studies are strikingly conflicting. This work attempts to clarify the geology of Ikaria by a new geological mapping and structural field study coupled with a thermometric study by Raman spectrometry of carbonaceous material (RSCM). Foliation over the whole island defines a structural dome, lately intruded by intrusive granitic bodies. Lineation shows a ca. N-S ductile stretching associated with an overall top-to-the-North sense of shear. Final exhumation of the dome was thus completed by a system of two top-to-the-North detachments, operating in the ductile and then the brittle fields. The proposed tectono-metamorphic evolution of the dome is consistent with the evolution of the northern Aegean area, suggesting that Ikaria belongs to the Aegean MCC and that the NCDS continues eastward. Besides, the distribution of RSCM temperatures within the dome and the presence of migmatites in the western part of the island comply with the description of migmatite-cored MCC such as Naxos or Mykonos. A better comprehension of the geology of the island also permits to discuss the correlations of tectonic events and nappes between the Cyclades and the neighboring Menderes massif in western Turkey.